

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 12180471	<b>FOR FURTHER ACTION</b>	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. <b>PCT/AU2003/001474</b>	International Filing Date (day/month/year) 6 November 2003	Priority Date (day/month/year) 6 November 2002
International Patent Classification (IPC) or national classification and IPC  Int. Cl. <sup>7</sup> G06F 9/00		
Applicant  CODE VALLEY PTY LIMITED et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.  <input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  These annexes consist of a total of 11 sheet(s).
3. This report contains indications relating to the following items:  I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input checked="" type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 4 June 2004	Date of completion of the report 7 February 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer  <b>DALE SIVER</b> Telephone No. (02) 6283 2196

**I. Basis of the report****1. With regard to the elements of the international application:\***

- ☐ the international application as originally filed.
- ☒ the description, pages 1-113 as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of
- ☒ the claims, pages , as originally filed,  
pages , as amended (together with any statement) under Article 19,  
pages , filed with the demand,  
pages 114-124 received on 4 February 2005 with the letter of 4 February 2004
- ☒ the drawings, pages 1/45 to 45/45 as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of
- ☐ the sequence listing part of the description:  
pages , as originally filed  
pages , filed with the demand  
pages , received on with the letter of

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

**4. ☐ The amendments have resulted in the cancellation of:**

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims 1-65	YES
	Claims	NO
Inventive step (IS)	Claims 1-65	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-65	YES
	Claims	NO

2. Citations and explanations (Rule 70.7)

- D1 US 6405361 B1 (BROY ET AL) 11 June 2002  
 D2 EP 1211598 A1 (TEXAS INSTRUMENT INCORPORATED) 5 June 2002  
**NEW CITATIONS**  
 D3 US 2002/0178211 A1 (SINGHAL et al.) 28 November 2002 See Box VI  
 D4 US 5,524,253 (Pham, et al.) 4 June 1996  
 D5 WO 2001/009721 A2 (AC PROPERTIES BV) 8 February 2001

**Novelty (N)**

Citations D1, D2 and D5 are exemplary of a type of distributed run-time application with components. D5 discloses the Microsoft Transaction Server environment. Other types of distributed application environments include, J2EE, CORBA and the like.

Citations D4 discloses that "Node-specific data manipulation modules are formed at each node during start-up of the system and, and these modules are automatically distributed to nodes on the network having the same architecture." In the summary of the invention (D4) it is stated that the software tool "enables a system integrator or end-user flexibly and efficiently to produce run time software".

None of the citations disclose code generation by component servers as presently claimed. The (amended) claims are novel in light of the above cited documents.

**Inventive step (IS)**

It is not considered obvious to generate code using components, using the component servers and the particular steps (as presently defined in the claims). The method and apparatus has features for combining data manipulation services (see page 16 lines 21-33). These features provide the surprising advantage (inter alia) that the generated code can be more easily optimised than the prior art.

The claims satisfy the inventive step requirements of the PCT.

**Industrial applicability (IA)**

The application satisfies this criterion of the PCT rules

**VI. Certain documents cited****1. Certain published documents (Rule 70.10)**

Application No. Patent No.	Publication date (day/month/year)	Filing date (day/month/year)	Priority date ( valid claim) (day/month/year)
20020178211	28 November 2002	3 May 2001	3 May 2001

D3 discloses a "data manipulation service" see sections [0078], [0087], [0088], [0094].

In addition D3 discloses determining requirements of the service (ie. code requirements) and implementing a particular data manipulation service, see sections [0033], [0046], [0087], [0088]. The system checks the "data manipulation server" to see if the requested operation is available in the current location.

The "data manipulation service" of D3 may be implemented by invoking a series of data manipulation operations, where the operations correspond to computer code executed on the data manipulation server. Amendments to claims have overcome the novelty objection.

**2. Non-written disclosures (Rule 70.9)**

Kind of non-written disclosure	Date of non-written disclosure (day/month/year)	Date of written disclosure referring to non-written disclosure (day/month/year)
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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

- 1) A method of generating code using components, each component embodying a respective data manipulation service, the method including:
  - a) Determining a component combination, the component combination defining a series of data manipulations and being defined in accordance with requirements to allow a desired functionality to be achieved; and,
  - b) Implementing the component combination to generate the computer code by:
    - i) Causing the implementation of a component server corresponding to each component in the combination, each component server being implemented by a processing system; and,
    - ii) Causing each component server to perform the respective data manipulation service in accordance with the defined series of data manipulations, at least some of the component servers performing the respective service by interacting with a data sequence, and at least some of the component servers performing service by at least one of:
      - (1) interacting with one or more component servers; and,
      - (2) causing the implementation of further components; and,
    - iii) obtaining, as a result of performing the series of data manipulations and from the data sequence, a resultant data sequence, the resultant data sequence being the computer code; and
  - c) Providing the computer code to a processing system, such that execution of the computer code by the processing system causes the processing system to perform the desired functionality.
- 2) A method according to claim 1, at least some of the components including one or more ports for receiving and/or outputting data to be manipulated.
- 3) A method according to claim 2, each port having an agent adapted to control transfer of data to and from the component.
- 4) A method according to claim 2 or claim 3, the method including having the component:
  - a) Receive data including a number of data portions;
  - b) Manipulate the data sequence by:
    - i) Adding data portions into the sequence at a predetermined location;
    - ii) Moving data portions from a first location to a second location within the sequence;
    - iii) Removing data portions from the sequence; and,
    - iv) Modifying data portions in the sequence.
- 5) A method according to claim 4, at least a portion of the method being performed using a processing system including a store, the method including storing one or more of the data portions in the store.
- 6) A method according to any one of the claims 1 to 5, at least some of the components being formed from a number of combined sub-components, the sub-components also being components.

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- 7) A method according to any one of the claims 1 to 6, at least some of the components being formed using at least one of:
- a) Manual manipulation of the data by an individual;
  - b) Computer code adapted to be executed by a processing system, to thereby manipulate of the data automatically; and,
  - c) Combinations of sub-components, the sub-components also being components.
- 8) A method according to any one of the claims 1 to 7, the method being performed using one or more processing systems.
- 9) A method according to claim 8, the method including causing a first processing system to:
- a) Select a number of components in response to input commands received from a user;
  - b) Define the component combination using the selected components; and,
  - c) Cause the component combination to be implemented such that the defined series of data manipulations is performed.
- 10) A method according to claim 9, at least some of the components including one or more ports, the method including causing the processing system to:
- a) Provide an indication of the ports of each selected component to the user; and,
  - b) Interconnect selected ones of the ports in response to input commands from the user to thereby define the component combination.
- 11) A method according to any one of the claims 8 to 10, the method including causing a second processing system to:
- a) Determine details of a number of components;
  - b) Provide at least an indication of the details to the user via the first processing system.
- 12) A method according to claim 11, the method including causing the processing system to:
- a) Select respective ones of the components in response to input commands from the user; and,
  - b) Provide the details of the selected components to the user via the first processing system.
- 13) A method according to claim 12, the details being component specifications, the processing system including:
- a) A store for storing the component specifications including at least one of:
    - i) An indication of the manipulation service;
    - ii) A graphical representation of the component; and,
    - iii) Port specifications defining the operation of the agents associated with each port; and,
  - b) A processor, the method including causing the processor to:
    - i) Obtain one or more component specifications from the store; and,
    - ii) Provide the component specifications to the user via the first processing system.

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- 14) A method according to any one of the claims 9 to 13, the method including causing the first processing system to:
- a) Generate a graphical representation of the one or more selected components; and,
  - b) Manipulate the graphical representation in response to input commands received from a user to thereby define the component combination.
- 15) A method according to any one of the claims 9 to 14, the first processing system being coupled to one or more component processing systems via a communications network, each component processing system being adapted to implement one or more respective components, the method including:
- a) Generating a service request for each component in the component combination; and,
  - b) Transferring the service request to each entity via the communications network, each entity being adapted to respond to the service request to implement the data manipulation embodied by the respective component.
- 16) A method according to claim 15, the method including:
- a) Determining any data required by the components; and,
  - b) Providing the data in the service request.
- 17) A method according to claim 15 or claim 16, each service request including an indication of the interconnections for each of the ports of the respective component.
- 18) A method according to claim 17, the method including causing each component processing system to:
- a) Implement one or more respective component instances in accordance with the received service request; and,
  - b) Cause each component instance to:
    - i) Interact with other components in accordance with the interconnections defined in the service request; and,
    - ii) Perform any required data manipulations.
- 19) A method according to claim 17 or claim 18, the method including causing each component processing system to:
- a) Implement a respective agent associated with each port; and,
  - b) Cause each agent to cooperate with an agent of another component in accordance with the defined interconnections, to thereby allow data to be transferred between the ports.
- 20) A method according to claim 11, the method including causing the second processing system to:
- a) Determine performance information, the performance information being representative of one or more criteria regarding the implementation of the components;
  - b) Provide the performance information to a user, the user selecting the components in accordance with the performance information.

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- 21) A method according to claim 20, the performance information including at least one of:
- a) An indication of the entity implementing the component;
  - b) An indication of the geographical location of the entity;
  - c) An indication of the duration for implementing the component;
  - 5 d) An indication of a cost associated with implementing the respective component; and,
  - e) A rating, the rating being indicative of the success of the component.
- 22) A method according to claim 20 or claim 21, the method including:
- a) Providing a number of different components for performing equivalent services, the different components being provided by different entities; and,
  - 10 b) Inducing competition between the entities to thereby drive improvement of the components.
- 23) A method according to any one of the claims 20 to 22, the method including generating revenue by charging a cost for the use of each component.
- 24) A method according to claim 23, the including:
- a) Providing at least some of the revenue to a respective entity implementing the component; and,
  - 15 b) Having the operator of the second processing system retain at least some of the revenue.
- 25) A method according to any one of the claims 1 to 24, the method including causing the generated code to be context dependent.
- 26) A method according to claim 25, the method causing at least some of the components to:
- a) Determine a context for the code; and,
  - 20 b) Perform the data manipulation service in accordance with the determined context such that the performed data manipulation is dependent on the context.
- 27) A method according to claim 26, the processing system including at least a memory, stack and registers, the context including at least one of:
- a) The state of at least one of the registers, stack and memory;
  - 25 b) Other components in the defined component combination; and,
  - c) Random factors.
- 28) A method according to claim 26 or claim 27, the method including making the data manipulation context dependent by at least one of:
- a) Dithering;
  - 30 b) Meshing; and,
  - c) Obscuring.
- 29) Apparatus for generating computer code using components, each component embodying a respective data manipulation service, the apparatus including one or more processing systems adapted to:



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- a) Determine a component combination, the component combination defining a series of data manipulations and being defined in accordance with the requirements to allow a desired functionality to be achieved; and,
- b) Implement the component combination to generate the computer code by:

- i) Causing the implementation of a component server corresponding to each component in the combination, each component server being implemented by a processing system; and,
- ii) Causing each component server to perform the respective data manipulation service in accordance with the defined series of data manipulations, at least some of the component servers performing the respective service by interacting with a data sequence, and at least some of the component servers performing service by at least one of:

- (1) interacting with one or more component servers; and,
- (2) causing the implementation of further components;

- iii) Obtaining as a result of the performing the series of data manipulations and from the data sequence, a resultant data sequence, the resultant data sequence being the computer code; and,

- c) Providing the computer code to a processing system, such that execution of the computer code by the processing system causes the processing system to perform the desired functionality.

30) Apparatus according to claim 29, the apparatus including:

- a) One or more component processing systems, each component processing system being adapted to implement a respective component; and,

- b) A first processing system, the first processing system being adapted to:

- i) Define the component combination in accordance with input commands received from a user;
- ii) Determine the component processing systems implementing the respective components; and
- iii) Transfer service requests to each of the determined component processing systems.

31) Apparatus according to claim 30, the component processing system being adapted to:

- a) Receive the service request;
- b) Generate a respective component instance; and,
- c) Perform the service using the respective component instance.

32) Apparatus according to any one of the claims 29 to 31, the apparatus including a second processing system, the second processing system being adapted to store details of available components.

33) Apparatus according to claim 32, the second processing system being adapted to obtain the details of a component from a respective component processing system.

34) Apparatus according to claim 32 or claim 33, the first processing system being adapted to cooperate with the second processing system to thereby allow a user to:

- a) Select one or more of the available components; and

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b) Define the component combination.

35) Apparatus according to any one of the claims 29 to 34, the apparatus being adapted to perform the method of any one of the claims 1 to 28.

36) A computer program product for generating computer code using components, each component embodying a respective data manipulation service for manipulating data in a predetermined manner, the computer program product including computer code which when executed on a suitable processing system causes the processing system to perform the method of one of the claims 1 to 28.

37) A method of allowing users to manipulate data, the method including using one or more processing systems coupled to a number of end stations via a communications network, using the one or more processing systems to:

a) Store details of a number of components, each component representing a respective data manipulation service implemented by a respective entity and the details being at least partly based on a component specification from a respective entity and the details being at least partly based on a component specification from the respective entity; and,

b) Provide details of selected components to users, thereby allowing the users to select components and define a component combination defining a series of data manipulation services for manipulating the data sequence using an end station;

c) Determine performance information representative of one or more criteria regarding the implementation of the components; and,

d) Provide the performance information to a user, the user selecting the components in accordance with the performance information.

38) A method according to claim 37, the performance information including at least one of:

a) An indication of the entity implementing the component;

b) An indication of the geographical location of the entity;

c) An indication of the duration for implementing the component;

d) An indication of a cost associated with implementing the respective component; and,

e) A rating, the rating being indicative of the success of the component.

39) A method according to claim 37 or claim 38, the method including:

a) Providing a number of different components for performing equivalent services, the different components being provided by different entities; and,

b) Inducing competition between the entities to thereby drive improvement of the components.

40) A method according to any one of the claims 37 to 39, the method including generating revenue by charging a cost for the use of each component.

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41) A method according to claim 40, the method including providing at least a portion of the fee to the respective entity.

42) A method according to any one of claims 37 to 41, the processing system including a store and a processor, the method including:

- a) Storing component specifications in the store; and,
- b) Providing the component specifications to the user via the end station, thereby allowing the user to define a component combination and implement the required data manipulation services.

43) Apparatus for allowing users to manipulate data, the apparatus including one or more processing systems coupled to a number of end stations via a communications network, the one or more processing stations adapted to:

- a) Store details of a number of components, each component representing a respective data manipulation service implemented by a respective entity and the details being at least partly based on a component specification from the respective entity;
- b) Provide details of selected components to users, thereby allowing the users to select components and define a component combination defining a series of data manipulation services for manipulating the data sequence using an end station;
- c) Determine performance information representative of one or more criteria regarding the implementation of the components; and,
- d) Provide the performance information to a user, the user selecting the components in accordance with the performance information.

44) Apparatus according to claim 43, the apparatus being adapted to perform the method of any one of the claims 37 to 42.

45) A computer program product for allowing users to manipulate a data sequence, the computer program product including computer code which when executed on a suitable processing system causes the processing system to perform the method of any one of the claims 37 to 42.

46) A method of providing a dynamic component for providing data manipulation services, the method including:

- a) Determining a service to be performed;
- b) Determining at least two methods of performing the service, wherein the methods of performing the service utilising respective components include:
  - i) Selecting components to implement the desired services;
  - ii) Defining a component schematic including at least:
    - (1) A first schematic portion representing any common portion of each method of performing the service;

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(2) At least two second schematic portions representing any different portion of each method of performing the services; and,

(3) A selector agent for selecting a respective one of the second schematic portions;

c) Determining a process of selecting one of the methods in accordance with received data; and,

d) Generating a component specification defining a component embodying the data manipulation service.

47) A method according to claim 46, the method including defining an agent associated with each input or output, the agent being adapted to cooperate with an agent of another component in accordance with the defined interconnections, to thereby allow data to be transferred between the ports of the components.

48) Apparatus for providing a dynamic component for providing data manipulation services, the apparatus including a processing system for:

a) Determining a service to be performed;

b) Determining at least two methods of performing the service, wherein the methods of performing the service utilising respective components include:

i) Selecting components to implement the desired services;

ii) Defining a component schematic including at least:

(1) A first schematic portion representing any common portion of each method of performing the service;

(2) At least two second schematic portions representing any different portion of each method of performing the services; and,

(3) A selector agent for selecting a respective one of the second schematic portions;

c) Determining a method of selecting one of the methods in accordance with received data; and,

d) Generating a component specification defining a component embodying the data manipulation service.

49) Apparatus according to claim 48, the processing system being adapted to perform the method of any one of the claims 47 and 48.

50) A computer program product for providing a dynamic component for providing data manipulation services, the computer program product including computer code which when executed on a suitable processing system causes the processing system to perform the method of any one of the claims 46 to 50.

51) A method of generating code by allowing users to manipulate a data sequence, the method including:

a) Providing details of a number of components, each component embodying a respective data manipulation service implemented by a respective entity;

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- b) Allowing users to define a component combination, the component combination defining a series of data manipulations and being defined in accordance with requirements to allow a desired functionality to be achieved; and,
- c) Implementing the component combination to generate the computer code by:
- 5 i) Causing the implementation of a component server corresponding to each component in the combination, each component server being implemented by a processing system; and,
- 10 ii) Causing each component server to perform the respective data manipulation service in accordance with the defined series of data manipulations, at least some of the component servers performing the respective service by interacting with a data sequence, and at least some of the component servers performing service by at least one of:
- (1) interacting with one or more component servers; and,
- (2) causing the implementation of further components;
- iii) Obtaining as a result of performing the series of data manipulations and from the data sequence, a resultant data sequence, the resultant data sequence being the computer code; and,
- 15 c) Providing the computer code to a processing system, such that execution of the computer code by the processing system causes the processing system to perform the desired functionality.

52) A method according to claim 51, the method including:

- a) Allowing users to select components; and,
- 20 b) Providing users with a component specification for each selected component, each component specification defining the data manipulation service and port specifications defining data to be received at or output from respective ports.

53) A method according to claim 52, the method including obtaining the component specification for a respective component from an entity implementing the component.

25 54) A method according to claim 52 or claim 53, the method being implemented using one or more processing systems coupled to a user end station via a communications network, the method including:

- a) Allowing the user to select the components using the end station; and,
- b) Transferring the component specifications to the end station from one or more of the processing systems.

30 55) A method according to any one of the claims 52 to claim 54, the method including allowing users to select the components in accordance with performance information including at least one of:

- a) An indication of the entity implementing the component;
- b) An indication of the geographical location of the entity;
- c) An indication of the duration for implementing the component;

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- d) An indication of a cost associated with implementing the respective component; and,
- e) A rating, the rating being indicative of the success of the component.

56) A method according to any one of the claims 52 to claim 55, the method including:

- a) Causing the end station to generate service requests in accordance with the component combination; and,
- b) Transferring the service request to entity processing systems thereby causing the entity processing systems to perform the data manipulation defined by the component.

57) A method according to claim 56, the component combination defining connections between the components, the service requests including connection information determined by the end station from the component specifications.

58) A method according to claim 57, the method including causing the component processing systems to:

- a) Generate one or more component instances in accordance with the received service request;
- b) Cause each component instance to:
  - i) Cooperate with other components to send and/or receive data; and,
  - ii) Perform the required data manipulation service.

59) Apparatus for generating code, the apparatus including a system for:

- a) Providing details of a number of components, each component representing a respective data manipulation service implemented by a respective entity;
- b) Allowing users to define a component combination defining a series of data manipulation services; and,
- c) Implement the component combination to generate the computer code by:
  - i) Causing the implementation of a component server corresponding to each component in the combination, each component server being implemented by a processing system; and,
  - ii) Causing each component server to perform the respective data manipulation service in accordance with the defined series of data manipulations, at least some of the component servers performing the respective service by interacting with a data sequence, and at least some of the component servers performing service by at least one of:
    - (1) interacting with one or more component servers; and,
    - (2) causing the implementation of further components;
  - iii) Obtaining as a result of performing the series of data manipulations and from the data sequence, a resultant data sequence, the resultant data sequence being the computer code; and,
- c) Providing the computer code to a processing system, such that execution of the computer code by the processing system causes the processing system to perform the desired functionality.

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60) Apparatus according to claim 59, the apparatus being adapted to perform the method of any one of the claims 52 to 58.

61) A computer program product for allowing users to manipulate data, the computer program product including computer code which when executed on a suitable processing system causes the processing system to perform the method of an one of the claims 52 to 58.

62) A method according to claim 1, wherein the method further includes, implementing at least some component servers by:

- a) Determining a context from the defined component combination; and,
- b) Performing the data manipulation service in accordance with the determined context.

63) A method according to claim 1, wherein at least some of the components include a number of predetermined techniques for performing the respective data manipulation service, and wherein the method includes implementing at least some of the component servers by:

- a) Selecting one of the predetermined techniques based on the component combination; and,
- b) Performing the respective data manipulation service using with the selected predetermined technique.

64) Apparatus according to claim 29, wherein the at least some component servers re implemented by:

- a) Determining a context from the defined component combination; and,
- b) Performing the data manipulation service in accordance with the determined context.

65) Apparatus according to claim 29, wherein at least some of the components include a number of predetermined techniques for performing the respective data manipulation service, and wherein at least some of the component servers are implemented by:

- a) Selecting one of the predetermined techniques based on the component combination; and,
- b) Performing the respective data manipulation service using with the selected predetermined technique.